

Name: _____

at1121exam_practice: Radicals and Squares (v9)

Question 1

Simplify the radical expressions.

$$\sqrt{98}$$

$$\sqrt{8}$$

$$\sqrt{63}$$

$$\frac{\sqrt{7 \cdot 7 \cdot 2}}{7\sqrt{2}}$$

$$\frac{\sqrt{2 \cdot 2 \cdot 2}}{2\sqrt{2}}$$

$$\frac{\sqrt{3 \cdot 3 \cdot 7}}{3\sqrt{7}}$$

Question 2

Find all solutions to the equation below:

$$\frac{(x+4)^2}{4} + 7 = 23$$

First, subtract 7 from both sides.

$$\frac{(x+4)^2}{4} = 16$$

Then, multiply both sides by 4.

$$(x+4)^2 = 64$$

Undo the squaring. Remember the plus-minus symbol.

$$x+4 = \pm 8$$

Subtract 4 from both sides.

$$x = -4 \pm 8$$

So the two solutions are $x = 4$ and $x = -12$.

Question 3

By completing the square, find both solutions to the given equation. *You must show work for full credit!*

$$x^2 - 10x = 39$$

$$x^2 - 10x + 25 = 39 + 25$$

$$x^2 - 10x + 25 = 64$$

$$(x - 5)^2 = 64$$

$$x - 5 = \pm 8$$

$$x = 5 \pm 8$$

$$x = 13 \quad \text{or} \quad x = -3$$

Question 4

A quadratic polynomial function is shown below in standard form.

$$y = 5x^2 + 40x + 73$$

Express the function in **vertex form** and identify the **location** of the vertex.

From the first two terms, factor out 5 .

$$y = 5(x^2 + 8x) + 73$$

We want a perfect square. Halve 8 and square the result to get 16 . Add and subtract that value inside the parentheses.

$$y = 5(x^2 + 8x + 16 - 16) + 73$$

Factor the perfect-square trinomial.

$$y = 5((x + 4)^2 - 16) + 73$$

Distribute the 5.

$$y = 5(x + 4)^2 - 80 + 73$$

Combine the constants to get **vertex form**:

$$y = 5(x + 4)^2 - 7$$

The vertex is at point $(-4, -7)$.